A representative of the Olacaceae in the Eocene of Southeastern North America

Edward W. Berry

In 1930 I described[1] under the name of *Calycites milanensis* certain unidentified concrescent calices from the upper part of the Holly Springs sand, which is the middle formation of the Wilcox Eocene group along the eastern shore of the lower Eocene Mississippi Gulf embayment, from a locality 1 mile west of Milan in Gibson County, Tennessee. The associated fossils at this outcrop were seeds of *Anona robertsi;* pods described as *Leguminosites astragaliformis;* leaflets of *Mimosites variabilis*, *Canavalia eocenica* and *Sophora wilcoxiana;* and leaves of *Apocynophyllum sapindifolium* and *A. wilcoxense.*

Some months ago Dr. Roland W. Brown sent me specimens of calices of the existing *Heisteria acuminata* and a leaf of *Heisteria concinna* and called my attention to the similarity of the former to *Calycites milanensis.* I have recently canvassed all of the existing material of Heisteria in the National Herbarium and the conclusion is irresistable that *Calycites milanense* represents a lower Eocene representative of the genus Heisteria.

The plants associated with these calices are listed above and it is obvious that the two species ascribed to the genus Apocynophyllum are the only ones worth any consideration in the present connection.

The leaves of the modern species are somewhat variable even within the limits of a single species such, for example, as *Heisteria costaricensis* Donnell Smith from Costa Rica, but there are quite a number of species: *concinna*, *costaricensis*, *flexuosa*, etc. with leaves almost identical with those fossil ones named *Apocynophyllum sapindifolium.* This species was described from the Wilcox of Louisiana by Hollick in 1899 and in my subsequent work on the Wilcox was discovered at 28 different localities along both the eastern and western shores of the Eocene embayment.

There can be slight doubt but that these leaves are the leaves of the same botanical species as that which furnished the calices and I feel so sure of this that I propose that both leaves

[1] Berry, E. W. U. S. Geological Survey Prof. Paper 156, p. 142, pl. 49, figs. 6–8, 1930.

and calices shall now be referred to Heisteria under the oldest name—that proposed for the leaves, as follows:

Heisteria sapindifolia (Hollick) Berry

Apocynophyllum sapindifolium Hollick in Harris and Veatch. A preliminary report on the geology of Louisiana, p. 288, pl. 46, fig. 3, 1899.

Berry, U. S. Geol. Survey Prof. Paper 91, p. 344, pl. 102, fig. 1; pl. 108, fig. 5, 1916; Idem., 156, p. 129, pl. 19, figs. 13, 14; pl. 44, fig. 19, 1930.

Calycites milanensis Berry, Idem., p. 142, pl. 49, figs. 6-8, 1930.

The figures of Calycites cited show the size of the concrescent calyx with parts of the characteristically shaped margin and the central scar where the fruit was attached. In size, shape, scar, texture and character of the calyx there is exact agreement with the calices of existing species, such as *Heisteria acuminata*, *costaricensis* and a number of other Central American forms.

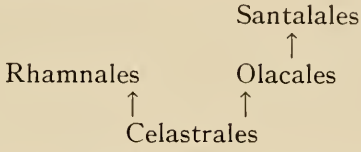
The genus Heisteria, or Hysteria as it is sometimes spelled, contains over a score of existing species of trees almost wholly confined to tropical Central and South America, but sparingly represented in tropical west Africa. The leaves vary from linear-lanceolate to ovate-lanceolate, with regularly spaced camptodrome secondaries, in some species, e. g. *Heisteria flexuosa* Engler from Brazil, these are comparatively straight, abruptly camptodrome with flat arches subparallel with the margins, and inosculating intermediate veins subparallel with the secondaries, and constitute a type which might easily be confused with the leaves of the Apocynaceae. Others less abruptly camptodrome leaves are exactly like *Apocynophyllum sapindifolium* in size, outline, and venation, both secondary and tertiary.

The existing Heisterias with wider and larger leaves and those seen from West Africa have much more emphasized secondaries which give them a wholly different aspect. As currently treated Heisteria constitutes the tribe Heisterieae, of that interesting and rather imperfectly understood family the Olacaceae, which has scarcely been known to be represented in the geological record. So far as I know no fossils had ever been referred to the family until 1933 when Reid and Chandler described[1] the endocarps of a species of *Olax* Linné—an old world

[1] Reid, E. M. & M. E. J. Chandler, The London Clay Flora British Museum (Natural History), 1933.

genus, and 2 species of *Erythropalum* Blume—an Indo Malayan genus. All three are from the London clay of Ypresian age which is, as nearly as intercontinental correlations can be made, the same age as the Wilcox Eocene of southeastern North America.

In Engler's scheme the Olacaceae were placed along with the Loranthaceae, Santalaceae, Myxodendraceae, Grubbiaceae and Balanophoraceae in the order Santalales, between the Proteales and Aristolochiales. In Hutchinson's more recent treatment (1926) the order Olacales is proposed for the two families Olacaceae and Opiliaceae and placed between the Celastrales and Santalales and the phylogenetic relationships are, I believe, accurately expressed as follows:



This corresponds much more closely with morphology and the known as well as surmised geological history than Engler's ideas do. The family Olacaceae, as now understood, contains between 20 and 25 genera and less than 150 species of shrubs and trees divided into 3 subfamilies all of which are represented in the tropics of both the old and the new worlds. There are 6 monotypic genera—one each in Borneo, Mauritius and the Amazon basin and 3 in Africa. There are 5 genera with about 23 species confined to America, 6 genera with about 16 species confined to Asia and 4 genera with less than 10 species confined to Africa. The genera Aptandra, Heisteria and Ptychopetalium with about 30 species are confined to America and Africa. Schoepfia with about a score of species is confined to America and Asia, Ximenia occurs in South America, Africa and Asia, Strombosia ranges from Africa to Malaya, and Olax with about 30 species extends from Africa to northern Australia. So far as I know this is the only genus that reaches Australia, and if true would seem to indicate that the Olacaceae did not take part in the Upper Cretaceous radiation of dicotyledonous floras. At the same time the existing distribution of the family is as good proof of its having had an extensive geological history as if the actual records had been uncovered in the rocks.

Johns Hopkins University
Baltimore, Md.